

REMARKS

The Examiner is thanked for the thorough examination of this application and the indication that claims 9-11, 13, 23-25, and 27 contain allowable subject matter. Additionally, the Office Action indicates that claims 8 and 22 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In view of the foregoing amendments, Applicant respectfully submits that all pending claims are in condition for allowance.

This is a full and timely response to the outstanding Office Action mailed May 31, 2005. Upon entry of the amendments in this response, claims 1-3 5, 7-11, 13, 15-17, 19, 21-25 and 27 remain pending. In particular, Applicants have amended claims 1, 5, 9, 15 and 23 without waiver, disclaimer or prejudice. In the amended claim 1, the limitation “a fourth lightly doped region of the second type adjacent to the first doped region and beneath the gate” has been underlined. Additionally, in the amended claims 1, 5, 9, 15 and 23, the limitation “and both sides of the gate” is amended to “and on both sides of the gate”, at the suggestion of the Office Action. No new matter has been added and the objection to claims should be overcome. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

Objection to the Specification and Rejections under 35 U.S.C 112

The Office Action rejected claim 5 under 35 USC 112, second paragraph, as allegedly failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As set forth above, Applicants have amended claim 5 to correct a mere typographical error. In particular, claim 5 is amended to return to the original claim 5 of the

present application. Accordingly, this amendment adds no new matter to the application.

Applicants respectfully assert the objection as to the claim has been accommodated.

Rejections under 35 U.S.C. 103

The Office Action indicates that claims 1-3, 7, 15-17, 19 and 21 stand rejected under 35 U.S.C 103(a) as allegedly unpatentable over Smayling et al. (US Pat. 5,275,961) in view of Beak et al. (US Pat. 6,465,845). Applicants respectfully traverse the rejections for at least the following reasons.

With respect to Smayling, Smayling discloses an n-channel vertical DMOS, in which an n+ region 640 is surrounded by an n- region 636, such that the n+ region 640 is isolated from a back gate contact region 644 by the n- region 636 (See FIG. 16g). Note that the n- region 636 overlaps or surrounds the n+ region 640, rather than is adjacent to the n+ region 640. In other words, the n+ region 640 is formed in the n- region 636, rather than adjacent to the n- region 636.

With respect to Beak, Beak discloses a method for fabricating an EDMOSFET, in which n type impurity ions are heavily injected into a p type Dwell region 34 to form a source region 36. Next, p type impurity ions are injected into a portion adjoining to the source region 36 to form a p+ type body contact region 38 (See col. 5, lines 35-41 and Fig. 3G). Note, however, than there is not a lightly doped region of n type adjacent to the n type source region 36.

Additionally, the Office Action admits that Smayling does not disclose the third doped region adjacent to the first doped region, but Fig. 3I of Beak discloses a third doped region 38 adjacent the first region 36. The Office Action alleged, however, that it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Smayling by having the third doped region adjacent the first doped region as disclosed by Beak.

Applicants respectfully disagree. Note that the n+ region 640 of Smayling must be formed within a low density implanting region 634. As a result, the n+ region 640 must be separated from the back gate contact region 644 by the low density implanting region 634. The n+ region 640 cannot be formed adjacent to the back gate contact region 644, due to the existence of the low density implanting region 634. Conversely, the p+ type body contact region 38 of Beak can be adjoining to the n type source region 36 because there is not a lightly doped region around the source region 36. Therefore, there is no reason to additionally form a light doped region to surround the source region 36, as disclosed by Smayling, or adjoin to the source region 36. Accordingly, Applicants respectfully assert that there is no motivation to combine Smayling with Beak.

Turning now to the amended claims, claim 1 recites:

1. A high voltage device comprising:
 - a substrate;
 - first and second wells respectively of a first type and a second type in the substrate;
 - a gate formed on a junction between the first and second wells, without a field oxide between the gate and the first and second wells;
 - first and second doped regions both of the second type, respectively formed in the first and second wells and on both sides of the gate;
 - a third doped region of the first type in the first well and adjacent to the first doped region; and***
 - a fourth lightly doped region of the second type adjacent to the first doped region and beneath the gate.***

(Emphasis Added).

Additionally, claim 15 recites:

15. A method for manufacturing a high voltage device, comprising the steps of:
 - providing a substrate;
 - forming first and second wells respectively of a first type and a second type in the substrate;

forming a gate on a junction between the first and second wells, without a field oxide formed between the gate and the first and second wells;
forming first and second doped regions both of the second type, respectively in the first and second wells and on both sides of the gate;
forming a third doped region of the first type in the first well and adjacent to the first doped region; and
forming a fourth lightly doped region of the second type adjacent to the first doped region and beneath the gate.

(Emphasis Added).

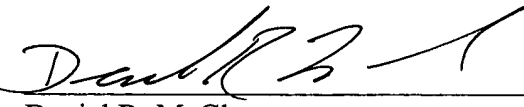
According to MPEP 2143, to establish a prima facie case of obviousness, the prior reference (or references when combined) must teach or suggest all the claim limitations. Moreover, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. As set forth above, Applicants respectfully assert that Smayling and Beak do not teach or reasonably suggest at least the features/limitations that have been emphasized above in independent claims 1 and 15. Moreover, there is no motivation to combine Smayling with Beak. Accordingly, Applicants respectfully assert that the rejection of claims 1 and 15 is deficient and that these claims are in condition for allowance. Further, since dependent claims 2-3, 5 and 7 incorporate the limitations of claim 1, and dependent claims 16-17, 19 and 21 incorporate the limitations of claim 15, Applicants respectfully assert that these claims also are in condition for allowance.

CONCLUSION

In view of the foregoing, it is believed that all pending claims are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

No fee is believed to be due in connection with this amendment and response to Office Action. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,

By: 
Daniel R. McClure
Registration No. 38,962

Thomas, Kayden, Horstemeyer & Risley, LLP
100 Galleria Pkwy, NW
Suite 1750
Atlanta, GA 30339
770-933-9500